Creating Future Fuels

भापेस

75 Years of CSIR Touching Lives

A report

on

CSIR- Harnessing Appropriate Rural Intervention and Technologies (CSIR-HARIT)

AcSIR

Project Theme

Environmental Management within CSIR- Indian Institute of Petroleum: To Improve Sustainability within the Campus

(Biodiversity and Transportation Usage Pattern)

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1. Introduction

CSIR-Indian Institute of Petroleum (IIP) is situated in Dehradun, the capital city of Uttarakhand and is located in the vicinity of Rajaji National Park. Due to close proximity with forest, large number of wild mammals, ornithological as well as reptilian species have made their habitat within the campus which are a part of ecosystem of Rajaji National Park. With an area of 1.04 km^2, the institute has a total of 8230 trees (fruit and non-fruit) with more than 300 species. Common trees that are present inside the campus are mango, litchi, pomelo, jackfruit, and Indian gooseberry(amla). Apart from these trees, institute also has a tea garden which spreads over 80 acres of land. Environmental awareness of people has helped in maintaining the cleanliness and scenic beauty of the campus.

2. Data Compilation and Analysis

On a closer look to the tender documents issued through 2015 to 2019 it is found that the campus has more than 1000 fruit bearing trees. Their number is shown below in the Table 1.

Table 1. Number of fruit bearing trees in the campus

Trees	**Count on 2017**	**Count on 2019**
Mango	660	561
Litchi	92	103
Kathal (Jackfruit)	05	04
Chakotra (Pomelo)	356	335
Amla (Indian gooseberry)	76	76
Orange	06	-

Fruit bearing trees are the common reason due to which animals from the neighbouring national park come into the region that falls under IIP. Among the species of wild animals and birds that are frequently sighted in the campus are given in Table 2 and the photographs of some animals and birds are given in Figure 1.

Table 2. Species of animals that were seen inside the campus.

S. No.	Species name	Sighting during 2017-2018	Sighting during 2018-2019
1	Monkey (*Macaca mulatta*)	+	+
2	Gray Langur (*Semnopithecus entellus*)	+	+
3	Indian Gray Mongoose (*Herpestes edwardsii*)	+	-
4	Leopard (*Panthera pardus*)	+	+
5	Asian Elephant (*Elephas maximus*)	+	-
6	Wild Boar (*Sus scrofa*)	+	+
7	Chital (*Axis axis*)	+	+
8	Sambar Deer (*Rusa unicolor*)	+	+
9	Barking Deer (*Muntiacus muntjac*)	+	+

'+' for sighting positive and '-' for not sighted

Interaction of the wildlife and local populace within the campus

Close proximity of wildlife with humans is unsafe for both animals and humans and can often lead to serious consequences. In the institute there have been many cases where the wild species, both herbivorous and carnivorous, came in contact with the members of the institute. However, no cases have been reported to be fatal. Monkeys and langurs have often been seen to bump into humans. In some cases, monkey attacks were also reported. Herbivorous animals such as wild boar, chital and deer generally avoid to come into contact with human due to their

natural instincts in response of fear of being hunted and hide within the lush grasses in the areas within the institute. Due to the migration of the herbivorous species from Rajaji National Park to the forest area inside CSIR-IIP, nocturnal animal like leopard have also been sighted.

Initiative to Preserve Biodiversity

The objective to improve the sustainability, and maintain inside the campus of institute and reduce the resource utilization. Initiatives taken towards preservation of environment have transformed the campus of CSIR IIP to eco-campus in recent years. Steps include conversion of biodegradable waste to bio-gas. More than 5 pits have been dug for converting kitchen waste to manure. The plastic waste is segregated and deposited for recycling. Cleanliness drives like "Swachh Bharat" are carried out regularly for raising awareness about reducing the use of plastic. 250-300 trees are planted every year on Van Mahotsav (1^{st} of July).

Initiative to Reduce Transportation Load /Pattern

Transportation is the major reason for air as well as noise pollution. The increasing numbers of vehicles including two wheelers and four-wheeler is the new challenge to control the NO_x and CO_2 emissions. Though plantation of trees is helpful in reducing the CO_2 levels to some extent, yet the increase in number of vehicles is significant. Also, the noise pollution is the common factor for the migration of wild animals from the campus. Due to regular check of speed limit with speed breakers, accidents and fatality of wild animals have not been reported. The data regarding the numbers of vehicles visiting the campus was collected over an interval of one year, from 2017-2018 and 2018-2019 and is shown in Table 3 given below. Table 4 shows the vehicles parked over different parking spots within the campus.

Table 3. Number of vehicles of visitors that visited the institute from 2017-2019

S. No.	**Vehicle Type**	**Year interval of 2017-2018**	**Year interval of 2018-2019**
1	Bus	35	44

2	Truck	16	19
3	Car	204	222
4	Bike	392	457
5	Total	647	742

Table 4. Number of vehicles of permanent staff parked inside the campus

	Vehicles			
Parking Area	Buses	Trucks	Cars	Two-wheelers
Gate no 2	-	-	3	8
Outside Reception Area	-	-	2	30
Fire Station Area	-	-	13	13
Near Advanced Crude Lab	-	-	12	22
Near Canteen	-	-	18	48
GTL Area	-	-	3	17
Tech Block	1	2	17	68
Guest House	-	-	6	5
Total	**1**	**2**	**74**	**211**

3. Conclusions

It is important to manage and assess resources in a sustainable and environment friendly manner. Initiatives taken for maintaining the ecological balance have benefited the campus as well as biodiversity nearby. Tree plantation and cleanliness drives are major factors for the beauty and greenery of the campus.

4. Recommendations

Plants and trees that require more care should be targeted and provided the necessary nutrition and water periodically. Plantation of more trees should be done periodically. Frequency of cleanliness drives should be increased. Transportation management should also be considered by which the number of vehicles entering the campus can be significantly reduced through sharing of vehicles *i.e.,* carpooling. Bicycles should be promoted as the mode of transportation within the campus.

5. Acknowledgement

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Figure 1. Some animals and birds that were sighted and photographed inside the campus.